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IS 10655 (1999): Rubber Steam Hose [PCD 13: Rubber and Rubber Products]

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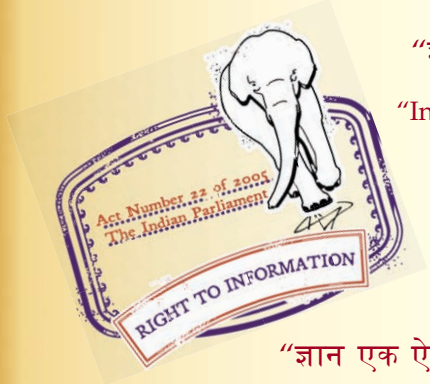

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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IS 10655 : 1999
(Reaffirmed 2003)

भारतीय मानक

भाप के रबड़ हौज – विशिष्टि

(पहला पुनरीक्षण)

Indian Standard

RUBBER STEAM HOSE — SPECIFICATION

(First Revision)

ICS 23.040.70

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

February 1999

Price Group 2

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

This standard was published in 1983. In this version (first revision) requirements of change in length at proof pressure, maximum twist at proof pressure, characteristics of hydrostatic test and hoses of 45.00 mm, 63.00 mm and 80.00 mm bore diameter have been included. Adhesion requirement and test method, construction and method of test for steam resistance have been modified. Types of hoses have been reduced from four to three.

In the preparation of this standard assistance has been derived from the following:

ISO 6134 : 1992 Rubber hoses and hose assemblies for steam Specification

BS 5342 Rubber hose for high pressure saturated steam

BS 5122 Rubber hose for saturated steam

This standard contains clauses **5.2.3**, **5.2.8**, **6.1** and **8** which call for agreement between the purchaser and the supplier.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 SEPTEMBER 2012
TO
IS 10655 : 1999 RUBBER STEAM HOSE — SPECIFICATION

(First Revision)

[*Page* 2, *Table* 3, *Title*] — Substitute the following for the existing title:

'Tensile, Elongation at Break and Steam Resistance Test'
(*Clauses* 5.2.6 *and* 5.2.7)

[*Page* 2, *Table* 3] — Insert the following new requirements after Sl No. (iv):

Sl No.	Characteristic	Type 1	Type 2	Type 3
(1)	(2)	(3)	(4)	(5)
v)	Tensile strength, MPa, *Min*			
	Lining	9	12	12
	Cover	8	10	10
vi)	Elongation at break, percent, *Min*			
	Lining	250	250	250
	Cover	300	300	300

Reprography Unit, BIS, New Delhi, India

Indian Standard

RUBBER STEAM HOSE — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard prescribes the requirements, method of sampling and test for rubber steam hose.

1.2 Steam hoses are not suitable for use in the preparation of food stuff such as steam cooking for special service application and pile drivers, etc.

2 NORMATIVE REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute the provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
443 : 1975	Methods of sampling and test for rubber hoses (*second revision*)
3400	Methods of test for vulcanized rubbers:
(Part 2):1995	Hardness (*second revision*)
(Part 5):1986	Adhesion of rubbers to textile fabrics (*second revision*)
7503	Glossary of terms used in rubber industry:
(Part 1):1988	Definitions of basic terms (*first revision*)
(Part 2):1988	Definitions of additives (*first revision*)
(Part 3):1988	Definitions relating to properties and testing (*first revision*)
(Part 4):1988	Definitions relating to processing (*first revision*)
(Part 5):1988	Definitions relating to products Hoses (*first revision*)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in various parts of IS 7503 shall apply.

4 TYPES

4.1 This standard covers three types of hoses depending upon working steam pressure:

Type 1 — For WP up to 5 bar (0.5 MPa) corresponding to a temperature of 151°C

Type 2 — For WP up to 10 bar (1.0 MPa) corresponding to a temperature of 184°C

Type 3 — For WP up to 16 bar (1.6 MPa) corresponding to a temperature of 204°C

4.2 End-fittings used with the hose shall be of a type which will permit compensation for creep of rubber during service.

5 REQUIREMENTS

5.1 Materials and Construction

5.1.1 *Lining*

The rubber lining shall be resistant to ageing by pressurized steam. The lining shall be smooth, seamless, uniform in thickness and free from air blisters, porosity and splits.

5.1.2 *Reinforcement*

The reinforcement shall consist of either textiles or steel wire or combination which ensures compliance of the hose with the requirements of hydrostatic tests, adhesion and resistance to steam.

5.1.3 *Cover*

The rubber cover shall be resistant to ozone. The cover shall be heat resistant and when required by the purchaser, it shall be oil resistant. The cover shall be free from any visible defect. Pricking of the hose cover shall not constitute a defect.

5.2 Dimensions and Tolerances

5.2.1 *Bore Size*

The nominal bore size of hose when measured according to the method prescribed in **4.2.1.2** of IS 443, shall meet the requirements given in Table 1

Table 1 Bore Sizes with Tolerance
(*Clause* 5.2.1)

Sl No.	Nominal Bore mm	Tolerance ± mm
(1)	(2)	(3)
i)	10.00	0.75
ii)	12.50	0.75
iii)	16.00	0.75
iv)	20.00	0.75
v)	25.00	1.25
vi)	31.50	1.25
vii)	38.00	1.50
viii)	45.00	1.50
ix)	50.00	1.50
x)	63.00	1.50
xi)	80.00	2.00

5.2.2 *Thickness of Lining and Cover*

When measured according to method **4.2.2** of IS 443, the minimum thickness of lining shall be 2 mm and that of cover shall be 1.5 mm.

5.2.3 *Length*

Length of the hose shall be as agreed to between the purchaser and the supplier. Tolerance on length shall be +1 percent.

5.2.4 *Adhesion*

When tested as per IS 3400 (Part 5) Machine method, the adhesion shall not be less than 2 kN/m for the following:

a) Between the lining and reinforcement,

b) Between layers of reinforcement, and

c) Between cover and reinforcement.

5.2.5 *Hydrostatic Test Requirements*

The hose when tested according to **8** of IS 443 shall comply with requirements of Table 2.

5.2.6 *Tensile Strength and Elongation at Break of Lining and Cover*

The tensile strength and elongation at break of the rubber used for lining and cover of the hose when tested according to the method prescribed in **5** of IS 443 shall be as specified in Table 3.

5.2.7 *Resistance to Steam*

5.2.7.1 On completion of the steam treatment given in Annex A, the test pieces shall show no cracks, blisters or pop-corning (an eruption evident on the surface of the hose after exposure to pressurized steam) when it is cut open after steaming and bursting pressure tests either in the lining or cover.

5.2.7.2 After exposure to steam as stipulated in Annex A, the hose shall comply with the requirements given in Table 3.

Table 2 Requirements for Hydrostatic Test
(*Clause* 5.2.5)

Sl No.	Characteristic	Type 1	Type 2	Type 3
(1)	(2)	(3)	(4)	(5)
i)	Proof pressure, bar	25	50	80
ii)	Change in diameter of proof pressure	+ 15%, − 5%	+15%, − 5%	+15%, − 5%
iii)	Change in length at proof pressure	± 12%	±12%	± 12%
iv)	Maximum twist at proof pressure, o/m	30	30	30
v)	Minimum burst pressure, bar	50	100	160

Table 3 Steam Resistance Test
(*Clauses* 5.2.6 *and* 5.2.7.2)

Sl No.	Characteristic	Type 1	Type 2	Type 3
(1)	(2)	(3)	(4)	(5)
i)	Drop in burst pressure, percent, *Max*	50	20	10
ii)	Drop in elongation at break of lining, percent, *Max*	50	50	50
iii)	Elongation at break of lining after steam treatment, percent, *Min*	150	150	150
iv)	Gain in lining hardness IRHD, *Max*	10	10	10

5.2.8 *Resistance to Oil of Cover*

If required by the purchaser, the cover may be oil resistant as determined and mutually agreed to by the purchaser and the manufacturer.

6 PACKING AND MARKING

6.1 Packing

The hose shall be packed as agreed to between the purchaser and the supplier.

6.2 Marking

Each length of the hose shall be indelibly marked, at least once every 3 m length, with the following:

a) Name of material;

b) Manufacturers' name or his recognized trade-mark, if any;

c) Steam hose type and working pressure;

d) Batch number and year of manufacture; and

e) Length of hose.

6.2.1 *BIS Certification Marking*

The hose may also be marked with the Standard Mark.

6.2.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7 SAMPLING

For the purpose of ascertaining the conformity of the hose in a consignment to the specification, the scale of sampling and the criteria for conformity shall be as prescribed in **3** of IS 443.

8 TESTS

Unless otherwise agreed to between the purchaser and the supplier all tests shall be carried out within three months of the date of receipt of material by the purchaser.

ANNEX A

(*Clauses* 5.2.7.1 *and* 5.2.7.2)

METHOD OF TEST FOR STEAM RESISTANCE

A-1 TEST PIECE

Four numbers test pieces shall be cut from the hose so as to give a length of 1 m clear of the end fittings. Attach fittings at both ends of each test piece.

A-2 PROCEDURE

A-2.1 Select any two test pieces and subject them to flowing saturated steam in a horizontal position such that the centre portions of the test pieces, say 25 to 40 mm below the horizontal plane of the end fittings. The pressure of steam and exposure time shall be as given below:

Type	*Steam Pressure Bar*	*Exposure Time (h)*
1	4.5 to 5.5	166 to 168
2	9.5 to 10.5	166 to 168
3	13.5 to 16.5	166 to 168

A-2.2 Allow the test pieces to cool and bend them through 180° four times over a mandrel of appropriate radius at room temperature. Rotate the test pieces through 90° between each bending operation given in Table 4.

Table 4 Mandrel Radius

(*Clause* A-2.2)

Sl No.	Nominal Bore	Mandrel Radius, mm	
	(mm)	Type 1	Types 2 and 3
(1)	(2)	(3)	(4)
i)	10.00	80	180
ii)	12.50	80	180
iii)	16.00	100	200
iv)	20.00	135	240
v)	25.00	170	300
vi)	31.50	240	400
vii)	38.00	300	500
viii)	45.00	300	500
ix)	50.00	375	650
x)	63.00	500	800
xi)	80.00	650	1 000

A-2.3 Determine the burst pressure of all four test pieces as per **8** of IS 443.

A-2.4 Determine the elongation at break of lining of all four test pieces after bursting test as specified in **5** of IS 443.

A-2.5 Determine hardness by following the method stipulated in IS 3400 (Part 2) from the lining of the hose.

A-2.6 Inspect the lining and cover for cracks, blisters and pop-corning.

A-3 CALCULATION AND REPORT

a) Individual burst pressure,

b) Mean burst pressures of 'steamed hose',

c) Mean burst pressures of 'unsteamed hose',

d) Individual values for elongation at break of lining,

e) Mean elongation at break of 'steamed hose',

f) Mean elongation at break of 'unsteamed hose',

g) Individual values of hardness,

h) Mean hardness of 'steamed hose',

j) Mean hardness of 'unsteamed hose', and

k) Condition of lining and cover after steaming.

Bureau of Indian Standards

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Review of Indian Standards

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